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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/995,678	11/29/2001	Takashi Hosoya	Q67410	1021

21171 7590 11/23/2004  
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EXAMINER

THOMPSON, KENNETH L

ART UNIT	PAPER NUMBER
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3672

DATE MAILED: 11/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/995,678

Applicant(s)

HOSOYA ET AL.

Examiner

Kenn Thompson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16-20 is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 11 May 04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Specification*

The specification is objected to because of the following informalities: The center line average roughness, Ra, does not have a unit of measure. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 6, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ouchi et al., U.S. 6,299,542 in view of Yamamoto et al., U.S. 6,227,979 and Takemura et al., U.S. 5,411,336.

Regarding claims 1-4, Ouchi et al. discloses in figures 1-6 a constant velocity joint for use with a propeller shaft (not shown at 145). Ouchi et al. discloses an outer race (141) having a spherical inner surface with a plurality of track grooves (108) defined therein. Ouchi et al. discloses each track groove having a groove bottom of longitudinal sectional shape representing a curve. Ouchi et al. discloses an case hardened inner race (102) having a spherical outer surface having a plurality of track grooves (107) defined therein in correspondence with the respective track grooves in the outer race. Ouchi et al. discloses the track groove in the inner race having a groove bottom of a longitudinal sectional shape of a curve. Ouchi et al. discloses a plurality of balls (104) interposed between the outer and inner races and rotatably

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accommodated between the mating track grooves in the outer and inner races. Ouchi et al. discloses a case hardened retainer (109b) having a plurality of pockets accommodating the balls. Ouchi et al. discloses the retainer having a spherical outer surface held in surface contact with the spherical inner surface of the outer race and a spherical inner surface held in surface contact with the spherical outer surface of the inner race (fig 6). Ouchi et al. discloses the track grooves in the outer race having a center of curvature ( $O_e$ ) lying in an axial section of the outer race. Ouchi et al. discloses the track grooves in the inner race having an center of curvature lying on an axial section of the inner race ( $O_i$ ). Ouchi et al. discloses the center of curvature of each track groove in the outer race and the center of curvature of the track groove in the inner race being offset an equal distance ( $h$ ) fore and aft the angle center of the joint. Ouchi et al. discloses the spherical inner surface of the outer race and the track grooves in the outer race being defined by post hardening cut surfaces (col. 18, line 64 - 67). Ouchi et al. does not disclose the outer race being made of a medium carbon steel and each post-hardening cut surface having a surface roughness not greater than 0.8 as stipulated in B0601 of JIS standards. Yamamoto et al. teaches use of an outer race made of a medium carbon steel (col. 15, lines 49-31) which improves its bending strength and toughness. It would have been obvious to one having ordinary skill in the art at the time of the invention to arrange for the outer race disclosed by Ouchi et al. to be made from medium carbon steel as taught by Yamamoto et al. to improve the bending strength and toughness; the selection a known material on the basis of its suitability for the intended use being a matter of obvious design choice. *In re Leshin*, 125 USPQ 416. Takemura et al. teaches use of surface roughness being less than 0.8 microns as stipulated in B0601 of JIS standards (col. 2, lines 16-25) to avoid peeling damage. It would have been obvious to one having ordinary skill in the art at the time of the invention to arrange for the

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surfaces disclosed by Ouchi et al. to have a surface roughness less than 0.8 to lessen the chance of peeling damage thereby extending the useful life of the joint.

As to claim 6, Ouchi et al. discloses in figure 13 eight track grooves (1b, 2b) in the inner and outer races.

As to claim 12, Ouchi et al. discloses in figure 19 track grooves in the outer race having an oval transverse sectional shape.

As to claim 13, Takemura et al. teaches use of a surface having a roughness of 0.8 microns or less, as stipulated in B0601 of the JIS standards.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ouchi et al. et al., U.S. 6,299,542 in view of Krude, U.S. 4,529,254

As to claim 5, Ouchi et al. discloses in figure 5 the outer race (1) having an inlet mouth (133) and a rear opening (opening at 108) opposite the inlet mouth. Ouchi et al. discloses the outer race having a fitting flange (117) formed therewith at a location radially outwardly of an outer periphery of the inlet mouth and a cylindrical mount (axial extension of 133,131) formed so as to protrude axially outwardly from the opening. Ouchi et al. discloses a propeller shaft (not shown at 145) extends through the rear opening and is engaged with the inner peripheral surface (101c) of the inner race. Ouchi et al. does not disclose the rear opening having a diameter smaller than the diameter of the inlet mouth. Krude teaches in figure 1 use of rear opening (opening of 2 at 11) having a diameter smaller than the diameter of the inlet mouth (20) to allow for the removal of the propeller shaft through the inlet mouth of the wheel assembly. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the inlet mouth and rear opening disclosed by Ouchi et al. to have the diameter of the

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inlet mouth to be larger than the rear opening to allow for the removal the propeller shaft through the inlet mouth of the wheel assembly to enable quick replacement of the inner joint member and shaft.

Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ouchi et al. et al., U.S. 6,299,542 in view of Yamamoto et al., U.S. 6,367,981

As to claims 7-9, Ouchi et al. et al. discloses the retainer (109b). Ouchi et al. et al. does not disclose the surface of the retainer has a surface treatment layer of solid lubricant that is a low temperature sulfurized layer. Yamamoto et al. teaches in figure 1 use of a retainer (4) having a surface treatment layer of solid lubricant that is a low temperature sulfurized layer (col. 2, lines 2-21; molybdenum disulfide) to enhance performance in areas of elevated temperature, vacuum, special atmosphere, extreme low temperature and irradiation environments. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the surface of the retainer disclosed by Ouchi et al. to have a surface treatment layer of solid lubricant that is a low temperature sulfurized layer; as taught Yamamoto et al. to enhance performance in areas of elevated temperature, vacuum, special atmosphere, extreme low temperature and irradiation environments. It is well known that a rolling bearing is liable to scatter lubricant or grease that can enter the external atmosphere; therefore in cases where a pure atmosphere is required no lubricants or grease can be used.

Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ouchi et al. et al., U.S. 6,299,542 in view of Jacob et al., U.S. 5,580,313.

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As to claim 10, Ouchi et al. discloses the track grooves (108,107) of the inner and outer races. Ouchi et al. does not disclose the corresponding ball cooperate to define radial gaps there between of less than 0.05 mm. Jacob et al. teaches use of the ball to cooperate with the inner and outer races to define radial gaps there between of less than 0.05 mm (col. 4, lines 56-67) to provide the functional play that is required for the functioning of the joint. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the ball discloses by Ouchi et al. to cooperate with the inner and outer races to define a gap there between of less than 0.05 mm as taught by Jacob et al. to provide the functional play that is required for the functioning of the joint. Moreover the optimization of proportions in a prior art device is a design consideration within the skill of the art. In re Reese, 290 F.2d 839, 129 USPQ 402 (CCPA 1961).

As to claim 11, Jacob et al teaches in figure 1 the pockets (10) in the retainer (11) and the corresponding ball (9) cooperate to define positive axial gaps (col. 5, lines 14-22).

Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ouchi et al. et al., U.S. 6,299,542 in view of Ikezawa et al., U.S. 5,630,668.

Regarding claims 14 and 15, Ouchi et al. discloses all the claimed subject matter except for the retainer having a the surface treatment layer being a film of a solid lubricant, and an undercoat of manganese phosphate provided between the surface of the retainer and the solid lubricant. Ikezawa et al. teaches use of a surface treatment layer being a film of a solid lubricant, and an undercoat of manganese phosphate provided between the surface and the solid lubricant (col. 12, lines 33-58) to reduce the dynamic torque of the rolling elements and ensure adhesion of the lubricant to the surface via the phosphate. It would have been obvious to one

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having ordinary skill in the art at the time of the invention to arrange for the retainer to have a solid lubricant film and an undercoat of manganese phosphate provided between the surface of the retainer and the solid lubricant as taught by Ikezawa et al. to reduce the dynamic torque of the rolling elements and ensure adhesion of the lubricant to the surface via the phosphate, thereby extending the useful life of the joint.

### ***Allowable Subject Matter***

Claims 16-20 are allowed

The prior art of record does not disclose or suggest all the claimed subject matter including an undercoat of manganese phosphate between the surface of the retainer and the solid lubricant.

The prior art does not disclose the surface treatment layer formed on the inner and outer races is different than the surface treatment layer formed in the surface of the retainer.

### ***Response to Arguments***

Applicant's arguments with respect to claim 1-14 have been considered but are moot in view of the new grounds of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenn Thompson whose telephone number is 703 306-5760. The examiner can normally be reached on 7:00 am - 4:30 pm.



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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David J Bagnell can be reached on 703 308-2151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

18 November 2004



Kenn Thompson  
Primary Patent Examiner  
Art Unit 3672